LOCK DEVICE OF RETRACTABLE HANDLE OF LUGGAGE

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a luggage, and more particularly to a lock device of the retractable handle of the luggage.

2. Description of the Related Art

A conventional wheeled luggage has a case member on which a retractable handle and two wheels are mounted. The retractable handle can be extended so that user can hold a handgrip on a top of the retractable handle and draw the case member to run on the ground. The retractable handle also can be retracted to lift the case member. The length of the retractable handle depends on the size of the case member so that the extended handle should have a height that user can hold the handgrip in the upright posture.

In earlier days, the retractable handle only has two sections, in other words, the retractable handle has two tubes fitted to each other. Such retractable handle only meets the wheeled luggage with large size because the retractable handle still has a longer length in retraction. Multi-section retractable handles, which three or more tubes consist of the handle, are applied to the wheeled luggage in the present market. The multi-section retractable handle is provided with two or more lock devices in the tubes to lock the tubes in the extended condition and the retracted condition and to release the tubes for free movement. The conventional lock device makes more friction while the tubes are extended or retractable and, most of all, the conventional lock device has a complex structure that make the lock device costs much in manufacture.

SUMMARY OF THE INVENTION

The primary objective of the present invention is to provide a lock device of a retractable handle, which has a simple structure.

The secondary objective of the present invention is to provide a retractable handle, which tubes are shorter in lengths.

The third objective of the present invention is to provide a retractable handle having lock devices, which the lock devices reduce the friction of the handle while it is extended and retracted.

According to the objective of the present invention, a lock device of a retractable handle comprises a base; a slide movably mounted on the base for movement between a first position and a second position, wherein the slide has a lateral side on which has a lowland portion, an upland portion and a guiding portion between the lowland portion and the upland portion; a spring adapted to exert the slide moving to the first position, and a ball against the lateral side of the slide to be moved to the upland portion of the slide while the slide is moved to the first position and to be moved to the lowland portion while the slide is moved to the second position.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an exploded view of a preferred embodiment of the present invention;

FIG. 2 is a sectional view of the preferred embodiment of the present invention, which the retractable handle is in the extended condition;

FIG. 3 is a sectional view of the first lock device;

FIG. 4 is a lateral view of the second lock device;

FIG. 5 is a sectional view in part of the retractable handle in the extended

condition at where the first lock device is mounted;

FIG. 6 is a sectional view following FIG. 5, showing the first lock device being activated and the first tube being moved downwards;

FIG. 7 is a sectional view following FIG. 6, showing the first tube being moved downwards continually and adapted to activate the second lock device;

FIG. 8 is a sectional view following FIG. 7, showing the second lock device being activated to make the first and the second tubes could be moved downwards, and

FIG. 9 is a sectional view of the preferred embodiment of the present invention, which the retractable handle is moved to the retracted condition.

DETAILED DESCRIPTION OF THE INVENTION

As shown in FIG. 1, a retractable handle of the preferred embodiment of the present invention comprises five tubes, namely a first tube 10, a second tube 12, a third tube 14, a fourth tube 16 and a fifth tube 18. Each tube 10 to 18 respectively has a first end 101, 121, 141, 161 and 181 and a second end 102, 122, 142, 162 and 182 and the tubes 10, 12, 14 and 16 have the second ends 102, 122, 142 and 162 fitted to the first ends 121, 141, 161 and 181 of the tubes 12, 14, 16 and 18 such that the tubes are retractable. Four connectors 20, 22, 24 and 26 are inserted into the first ends 121, 141, 161 and 181 of the second, the third, the fourth and the fifth tubes 12, 14, 16 and 18 to make the movement of the tubes smoothly. Four lock devices, namely a first lock device 30, a second lock device 40, a third lock device 50 and a fourth lock device 60, are respectively mounted to the first, second, third and fourth tubes 10, 12, 14 and 16 at the second ends 102, 122, 142 and 162 thereof by pins 28. A handgrip (not shown) is mounted to the first end 101 of the first tube 10 in which a mechanism (not shown) is mounted and a button (not shown) is mounted on the handgrip to control the

mechanism. The mechanism is connected with the first lock device 30 such that the button is pressed to activate the first lock device 30 via the mechanism. The mechanism is a conventional device that you can find it in many inventions for detail.

The first tube 10 has a ball hole 103 adjacent to the second end 102 thereof. The second tube 12 has a first ball hole 123 and a second ball hole 124 at opposite sides adjacent to the second end 122, a first hole 125 adjacent to the first end 121 and a second hole 126 above the first ball hole 123, wherein the first ball hole 123, the first hole 125 and the second hole 126 are arranged at a side of the tube 12. The third tube 14 has a first ball hole 143 and a second ball hole 144 at opposite sides adjacent to the second end 142, a first hole 145 adjacent to the first end 141 and a second hole 146 above the second ball hole 144, wherein the first and the second hole 145 and 146 are arranged at opposite sides of the tube 14. The fourth tube 16 is as same as the third tube 14 but different in size, which has a first and a second ball holes 163 and 164 and a first and a second holes 145 and 166. The fifth tube 18 has a first hole 185 adjacent to the first side 181 and a second hole 186 adjacent to the second side 182.

As shown in FIG. 3, the first lock device 30 has a base 31 in which has a chamber 32, a slide 33 received in the chamber 32 for movement between a first position and a second position, two springs 34 mounted between the base 31 and the slide 33 adapted to exert the slide 33 to the first position and a ball 35. The base 31 has a seat 311 and two walls 312 projected upwards from the seat 311. Between the walls 312 is the chamber 32. Each of the walls 312 has a hook portion 313 adjacent to a distal end thereof. The slide 33 has two hook portions 333 to prevent the slide 33 escaping from the chamber 32 of the base 31. The slide 33 has a lowland portion 371 at a lateral side thereof, an upland portion 372 adjacent to the lowland portion 371 and a guiding portion 373 between the lowland portion 371 and the upland portion 372. The

ball 35 is against the lateral side of the slide 33 of the first lock device 30 for movement between the lowland portion 371 (while the slide 33 is moved to the second position) and the upland portion 372 (while the slide 33 is moved to the first position). The first lock device 30 is mounted in the second end 102 the first tube 10 and the ball 35 have a portion received in the ball hole 103 of the first tube 10.

As shown in FIG. 4, the second lock device 40 has a base 41 in which has a chamber 42, a slide 43 received in the chamber 42 for movement between a first position and a second position, two springs 44 mounted between the base 41 and the slide 43 adapted to exert the slide 43 to the first position, a first ball 45 and a second ball 46. The base 41 has a seat 411 and two walls 412 projected upwards from the seat 411. Between the walls 412 is the chamber 42. Each of the walls 412 has a hook portion 413 adjacent to a distal end thereof. The slide 43 has two hook portions 433 to prevent the slide 43 escaping from the chamber 42 of the base 41. The slide 43 is respectively provided with a first lowland portion 471, a first upland portion 472 and a first guiding portion 473 at a lateral side thereof and a second lowland portion 481, a second upland portion 482 and a second guiding portion 483 at the other lateral side thereof. The first upland portion 471 and the first guiding portion 473 are arranged at where under the first lowland portion 472 and the second upland portion 481 and the second guiding portion 483 are arranged at where above the second lowland portion 482 as shown in FIG. 7. The first ball 45 is moved to the first upland portion 471 and the second ball 46 is moved to the second lowland portion 482 while the slide 43 is moved to the first position and the first ball 45 is moved to the first lowland portion 472 and the second ball 46 is moved to the second upland portion 481 while the slide 43 is moved to the second position. The slide 43 is further moved to a third position at where between the first and the second positions. Both of the first and the second balls

45 and 46 drop into the first and the second lowland portions 471 and 481 respectively while the slide 43 is moved to the third position. The second lock device 40 is mounted in the second tube 12 at the second end 122 and the first and the second balls 45 and 46 respectively having a portion received in the first and the second ball holes 123 and 124 of the second tube 12.

The third and the fourth lock device 50 and 60 are as same as the second lock device 40 but different in size, so they are not described the detail. The third and the fourth lock device 50 and 60 are mounted in the second ends 142 and 162 of the third and the fourth tubes 14 and 16 respectively.

In the extended condition of the tubes, as shown in FIG. 2, the slides 33, 43, 53 and 63 of the lock devices 30, 40, 50 and 60 are at the first positions respectively and the ball hole 103 of the first tube 10 and the first ball holes 123, 143 and 163 of the second, the third and the fourth tubes 12, 14 and 16 align the first hole 125, 145, 165 and 185 of the second, the third, the fourth and the fifth tubes 40, 50 and 60 respectively. The ball 35 of the first lock device 30 and the first balls 45, 55 and 65 of the second, the third and the fourth lock devices 12, 14 and 16 are received in both of the (first) ball hole 103, 123, 143 and 163 and the first hole 125, 145, 165 and 185 respectively, such that the tubes 12, 14, 16 and 18 are no longer moved relatively to each other, in the other words, the retractable handle of the present invention is locked in the extended position.

While the button of the handgrip is pressed, the mechanism pushes the slide of the first lock device 30 to the second position. The ball 35 drops into the lowland portion 372 and escapes from the first hole 125 of the second tube 12 such that the first tube 10 is moved freely relative to the second tube 12 as shown in FIG. 6.

As shown in FIG. 7 and FIG. 8, the first tube 10 keeps moving downwards

and the base 31 of the first lock device 30 presses the slide 43 of the second lock device 40 downwards and moves the slide 43 to the third position, in which both of the first and the second balls 45 and 46 are received in the lowland portions 472 and 482 respectively, such that the first ball 45 escapes from the first hole 145 of the third tube 14 to release the second tube 12 for free movement.

For the same principle, the third lock device 50 and the fourth lock device 60 are activated in sequence while the tubes are moved downwards continually. At last, the ball hole 103 of the first tube 10 and the second ball holes 123, 143 and 163 of the second, the third and the fourth tubes 12, 14 and 16 align the second holes 126, 146, 166 and 186 of the second, the third, the fourth and the fifth tubes 12, 14, 16 and 18 and the slide 33 of the first lock device 30 is moved back to the first position and the slides 43, 53 and 63 of the second, the third and the fourth lock devices 40, 50 and 60 are kept in the second position. In such condition, the ball 35 of the first lock device 30 and the second balls 46, 56 and 66 of the second, the third and the fourth lock devices 40, 50 and 60 are pushed outwards by the upland portions 371, 481, 581 and 681 respectively and are received in both of the ball hole 103, 124, 144, and 164 and the second holes 126, 146, 166 and 186 respectively to lock the tubes 10, 12, 14, 16 and 18 in the retracted condition as shown in FIG. 9.

To release the tubes 10, 12, 14, 16 and 18 from the retracted condition as shown in FIG. 9, user just has to press the button on the handle again. The slide 33 of the first lock device 30 is moved to the second position to receive the ball 35 in the lowland portion 372 such that the first tube 10 is released from the second tube 12 for free movement. While the first tube 10 is moved upwards, the first lock device 30 is no longer pressing the slide 43 of the second lock device 40 and the slide 43 will be moved to the third position by the springs 44, such that the second tube 12 is moved

freely. For the same principle, the third and the fourth tubes 14 and 16 are released in sequence and finally the tubes 10, 12, 14, 16 and 18 will be back to the extended condition and be locked as shown in FIG. 2.

The advantages of the present invention are:

1. The structure of the lock device is simpler than the conventional device, with which the cost of manufacture of the lock devices is decreased and the probability of failure of the lock device is decreased too.

2. The balls reduce the friction while the tubes are extended and retracted. The retractable handle works more smoothly than the conventional retractable handle.

3. The lock devices have most of the volumes thereof received in the tubes so that the tubes have less lengths overlapped. For a predetermined length of the retractable handle in the extended condition, the total length of the tubes of the retractable handle of the present invention is shorter than the conventional retractable handle.

4. The retractable handle of the present invention might have only two tubes. Under such condition, only the first lock device is mounted on the first tube. The retractable handle of the present invention might have three or more tubes. Under such condition, the first lock device is mounted on the first tube and the second lock device is mounted on the second tube.